

the lowest power level that will provide the required signal quality as indicated in the application and further amended by coordination agreements.

(e) For operations at frequencies above 10 GHz, earth station operators may exceed the uplink e.i.r.p. and e.i.r.p. density limits specified in the station authorization under the conditions of uplink fading due to precipitation by an amount not to exceed 1 dB above the actual amount of monitored excess attenuation over clear sky propagation conditions. The e.i.r.p. levels shall be returned to normal as soon as the attenuating weather pattern subsides. The maximum power level for power control purposes shall be coordinated between and among adjacent satellite operators.

(f) The e.i.r.p. of any emission from an earth station operating in the frequency band 13.75–14.0 GHz shall be at least 68 dBW and shall not exceed 85 dBW, with a minimum antenna diameter of 4.5 meters; except in the frequency band 13.772–13.778 GHz, where the e.i.r.p. shall be at least 68 dBW and shall not exceed 71 dBW per 6 MHz, with a minimum antenna diameter of 4.5 meters. Automatic power control may be used to increase the e.i.r.p. density above 71 dBW per 6 MHz to compensate for rain attenuation to the extent that the power flux density at the fixed-satellite space station does not exceed the value resulting from use of 71 dBW per 6 MHz e.i.r.p. in clear sky conditions.

(g) All earth stations in the Fixed Satellite Service in the 20/30 GHz band shall employ uplink adaptive power control or other methods of fade compensation such that the earth station transmissions shall be conducted at the power level required to meet the desired link performance while reducing the level of mutual interference between networks.

[48 FR 40255, Sept. 6, 1983, as amended at 58 FR 13420, Mar. 11, 1993; 61 FR 52307, Oct. 7, 1996; 62 FR 61457, Nov. 18, 1997]

§ 25.205 Minimum angle of antenna elevation.

Earth station antennas shall not normally be authorized for transmission at angles less than 5° measured from the horizontal plane to the direction of

maximum radiation. However, upon a showing that the transmission path will be seaward and away from land masses or upon special showing of need for lower angles by the applicant, the Commission will consider authorizing transmissions at angles between 3° and 5° in the pertinent directions. In certain instances, it may be necessary to specify minimum angles greater than 5° because of interference considerations.

[48 FR 40255, Sept. 6, 1983]

§ 25.206 Station identification.

The requirement for transmission of station identification is waived for all radio stations licensed under this part with the exception of satellite uplinks carrying broadband video information which are required to incorporate ATIS in accordance with the provisions set forth under § 25.308 of these rules.

[55 FR 21551, May 25, 1990]

§ 25.207 Cessation of emissions.

Space stations shall be made capable of ceasing radio emissions by the use of appropriate devices (battery life, timing devices, ground command, etc.) that will ensure definite cessation of emissions.

§ 25.208 Power flux density limits.

(a) In the band 3700–4200 MHz, the power flux density at the Earth's surface produced by emissions from a space station for all conditions and for all methods of modulation shall not exceed the following values:

- 152 dB(W/m²) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
- $152 + (\delta - 5)/2$ dB(W/m²) in any 4 kHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and
- 142 dB(W/m²) in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane

These limits relate to the power flux density which would be obtained under assumed free-space propagation conditions.

(b) In the bands 10.95–11.2 and 11.45–11.7 GHz, the power flux density at the Earth's surface produced by emissions from a space station for all conditions

and for all methods of modulation shall not exceed the following values:

- 150 dB(W/m²) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
- 150+(δ –5)/2 dB(W/m²) in any 4 kHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane; and
- 140 dB(W/m²) in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane

These limits relate to the power flux density which would be obtained under assumed free-space propagation conditions.

(c) In the 17.7–19.7 GHz, 22.55–23.00 GHz, 23.00–23.55 GHz, and 24.45–24.75 GHz frequency bands, the power flux density at the Earth's surface produced by emissions from a space station for all conditions and for all methods of modulation shall not exceed the following values:

(1) 115 dB (W/m²) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane.

(2) 115+0.5 (d–5) dB (W/m²) in any 1 MHz band for angles of arrival d (in degrees) between 5 and 25 degrees above the horizontal plane.

(3) 105 dB (W/m²) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

[48 FR 40255, Sept. 6, 1983, as amended at 52 FR 45636, Dec. 1, 1987; 59 FR 53329, Oct. 21, 1994]

§ 25.209 Antenna performance standards.

(a) The gain of any antenna to be employed in transmission from an earth station in the fixed-satellite service shall lie below the envelope defined below:

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

$$\begin{aligned} &29-25 \log_{10} (\text{Theta}) \text{ dBi } 1^\circ \leq \text{Theta} \leq 7^\circ \\ &\quad +8 \text{ dBi } 7^\circ < \text{Theta} \leq 9.2^\circ \\ &32-25 \log_{10} (\text{Theta}) \text{ dBi } 9.2^\circ < \text{Theta} \leq 48^\circ \\ &\quad -10 \text{ dBi } 48^\circ < \text{Theta} \leq 180^\circ \end{aligned}$$

where Theta is the angle in degrees from the axis of the main lobe, and dBi refers to dB relative to an isotropic radiator. For the purposes of this section,

the peak gain of an individual sidelobe may not exceed the envelope defined above for Theta between 1.0 and 7.0 degrees. For Theta greater than 7.0 degrees, the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the gain envelope given above by more than 3 dB.

(2) In all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

Outside the main beam, the gain of the antenna shall lie below the envelope defined by:

$$\begin{aligned} &32-25 \log_{10} (\text{Theta}) \text{ dBi } 1^\circ \leq \text{Theta} \leq 48^\circ \\ &\quad -10 \text{ dBi } 48^\circ < \text{Theta} \leq 180^\circ \end{aligned}$$

where Theta and dBi are defined above. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the gain envelope given above by more than 6 dB. The region of the main reflector spillover energy is to be interpreted as a single lobe and shall not exceed the envelope by more than 6 dB.

(b) The off-axis cross-polarization gain of any antenna to be employed in transmission from an earth station to a space station in the domestic fixed-satellite service shall be defined by:

$$\begin{aligned} &19-25 \log_{10} (\text{Theta}) \text{ dBi } 1.8^\circ < \text{Theta} \leq 7^\circ \\ &\quad -2 \text{ dBi } 7^\circ < \text{Theta} \leq 9.2^\circ \end{aligned}$$

(c) Earth station antennas licensed for reception of radio transmissions from a space station in the fixed-satellite service are protected from radio interference caused by other space stations only to the degree to which harmful interference would not be expected to be caused to an earth station employing an antenna conforming to the referenced patterns defined in paragraphs (a) and (b) of this section, and protected from radio interference caused by terrestrial radio transmitters identified by the frequency coordination process only to the degree to which harmful interference would not be expected to be caused to an earth station conforming to the reference pattern defined in paragraph (a)(2) of this section.